

STALIN PRIZE

1948



VLADIMIR POPOV

*Steel  
and Slag*

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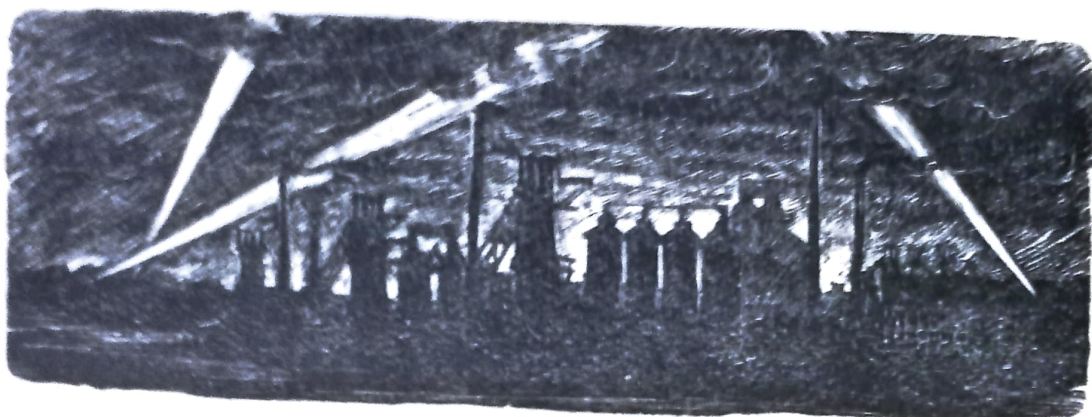
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## CHAPTER ONE

DUBENKO, the works director, called in the manager of the open-hearth shop and handed him a weighty memorandum book—specifications for the manufacture and rolling of a new grade of steel.

"We're shifting to a very complex alloy steel, Comrade Krainev," he said. "Armour plate, for tanks."

His tone admitted of no objections; but Krainev did object:

"Pyotr Ivanovich, our melters have never handled such steel before."

"Well, they'll handle it now. The war demands it."

Deliberately withholding the telegram received from the People's Commissar, who set a week's time for the fulfilment of this defence assignment, Dubenko added:

"I expect the first heat in three days, Sergei Petrovich."

"You can't mean that seriously, Pyotr Ivanovich. It'll take two days just to read the specifications," said the shop manager, weighing the bulky document in his hand.

"Read at night, and use the daytime to get ready," the director returned. "In three days, then." He got up, evidently considering that nothing more remained to be said.

Ordinarily, in making new assignments, the director accepted the time limits set by the people who were to carry his assignments out, demanding only—and with the utmost stringency—that these limits, once set, be punctiliously observed.

"I didn't hurry you; you named your own time," he would say in such cases.

But now he was setting the time himself, and it was bewilderingly brief.

"I can't do it in three days," Krainev told him bluntly.

"Just you try not to," the director exclaimed.

Sergei Petrovich was amazed by Dubenko's harsh tone, by the stern lines in which his face had set. Never before had he seen the director in such a mood.

the shop, Krainev assembled his managers, and foremen, and acquainted them with the new specifications.

"To turn everything upside down," was the comment of the head furnace tapper, Opanasenko—an enormous man, so fat that he creaked under his weight.

"What are we to do with the ingots, Sergei?" asked the teeming foreman. "We've got to take them straight to the rolling mill, but in the next grade we'll have to keep them in place. Where are we going to dig the pits?"

More difficulties were brought up. Krainev listened to his subordinates out attentively, giving them plenty of time to argue every point. It was late in the evening before their study of the new process drew to a close. Turning the last question to the chief manager, he looked intently into the eyes of Opanasenko, deeply concerned about the complications of the work ahead, wore an expression of helpless perplexity. Krainev, in simple, everyday language, he summed up the new process just discussed at length.

The chief foreman looked more cheerful. "It makes it easier," he said. "We'll manage."



The new instructions required the abandonment of traditions grown up at the works in the course of many years—required a complete reorganization of the shop, to be accomplished in a few short days.

Up to that time, the shop had made steel chiefly for girders and rails; now it must make steel that would resist armour piercing shells. Preparations began.

The specifications pointed out that this steel, while in process of production, was very sensitive to moisture. Again, it could not stand sudden cooling, and when subjected to drafts, to a flow of cold air, would "catch cold," displaying tiny hair cracks on fracture. Hence, it demanded gradual cooling in special soaking pits.

And so, the workers of the open-hearth shop set to: erecting drying plant, digging huge pits and fitting covers to them, checking scales, drawing up calculations, drafting diagrams, and erecting bins for materials the shop had never before required.

Morning and evening, the director would make the rounds of the shop, stopping frequently to talk with the workers.

On the third day, he came up to the shop manager and asked when the first heat could be expected.

Krainev reported to the director told him "I give you two more days." But two days passed and the shop was not launched. Agapov, the shop manager.

"When?" he demanded. "In another three days," Krainev, making a great show of hesitation.

He had hardly slept, tired to the verge of exhaustion.

"Three more days?" he said, dissatisfied.

Krainev rose heavily and went to the shop.

There were no extra hands, the most varied trades were called in day, helping to prepare for the defence assignment.

Two days later the director appeared in the shop, this time with Karov, the chief engineer. They were old friends: former school and low students. They had just graduated from the military academy; they had gained their commissions and were assigned positions.



Krainev reported the situation. Turning away, the director told him glumly:

"I'll give you two more days."

But two days passed, and still the first heat had not been launched. Again Dubenko summoned the manager.

"When?" he demanded sharply.

"In another three days, no sooner," said Krainev, making a great effort to restrain his irrita-

tion. He had hardly slept in all this time, and was now on the verge of collapse.

"Three more days?" Dubenko repeated, greatly satisfied.

Krainev rose heavily to his feet and went back to the shop.

There were no extra hands, and workers of the most varied trades stayed overtime day after day, helping to prepare the shop for the new furnace assignment.

Two days later the director once more appeared in the shop, this time accompanied by Makarov, the chief engineer. Krainev and Makarov were old friends: former fellow melters, and fellow students. They had separated only when, on graduation from the metallurgical institute where they had gained their engineering diplomas, they were assigned positions in different plants.

It was only two months since Krainev's transfer to his present position, from another section of the Donbas. Nobody at the works, however, regarded him as a newcomer. He had evinced from the first an ability and experience which relieved Makarov of all uneasiness for the open-hearth shop; and most of the chief engineer's time was now spent at the armour-plate rolling mill, where preparations were under way for rolling the new armour steel.

"We've got to start sometime," Dubenko told Krainev. His voice was strained and nervous.

"I'll start when I have everything ready," replied Krainev firmly. "I'll start when I can be sure the first heat will come out exactly right. It's not in my plans to spoil the steel, or the reputation of our shop, or—well, or my own reputation, either."

Dubenko, flaring up at once, exclaimed:

"I insist that you begin today!"

But Makarov drew the director aside.

"Pyotr Ivanovich," he said quietly, "Krainev is right. He'll be running the first few heats himself, to teach the foremen and melters. He has no right to make mistakes."

Dubenko's wrath subsided somewhat.

"Well, then, when do you promise the first heat?" he asked, turning back to Krainev.

"Tomorrow afternoon," Krainev replied briefly.

The director looked into his face attentively, noting the signs of fatigue.

"Get some rest before you begin," he said, more mildly. "Be sure you get some rest."

"Why tomorrow afternoon?" asked Matviyenko, secretary of the shop Party bureau, when the director and Makarov were gone. "Didn't you tell me the first heat would be tapped tonight? Remember, I said I was on duty at the Party committee tonight, and I was sorry because I couldn't be on hand."

"It will be tapped tonight, true enough," Krainev admitted. "Only I don't want the director around."

Coming into the shop that night, Gayevoi, secretary of the works Party committee, stopped by the control board in the corner, attentively watching the throng which had gathered around one of the furnaces. Many of the workers present had been on duty in the preceding shift. Gayevoi called to one of these.

"What are you doing here, Shatilov?" he asked when the worker came up, looking enquiringly into the energetic face.

Gayevoi had always liked this young foreman, with the scorched eyebrows and the scar across



his chin—an ex-soldier, who had retained from his army service, besides military carriage and precision of movement, that peculiar facility in issuing and obeying orders so typical of junior army commanders.

“What do you mean?” Shatilov demanded, staring at Gayevoi in frank surprise. “I’ve stayed on after my shift. After all, it’s the first heat, and such steel! Why, Lyutov’s here, even, and his shift comes on in the morning.” Shatilov pointed to a stocky, broad-shouldered foreman standing a little apart from the rest. “If we don’t watch, how are we going to learn? The shop manager won’t be running every heat for us.” And Shatilov hurried back to the furnace.

Gayevoi remained where he was, quietly watching. Krainev’s manner soon calmed his anxiety. The shop manager directed the work composedly as one engaged in the most ordinary daily task. Yet everything in the shop pointed to the unusual nature of what was taking place. The furnace had been freshly whitewashed, the metal structures painted; the tools were arranged in model order, and the alloying constituents lay in neat piles on the charging level.

Here, head foreman Opanasenko was in command. Although, in the general run of work,

Opanasenko mastered new grades of steel almost independently, this armour alloy was more than he could cope with. Krainev, however, considerate of the head foreman's pride, phrased the necessary instructions as simple requests for advice; and Opanasenko worked with his usual conscientious thoroughness.

Proudly, he showed Krainev the test sheet just brought from the laboratory. Both phosphorus and sulphur were extraordinarily low. Never in his life had he encountered steel so free of these elements.

"Hadn't we better add some nickel?" Krainev suggested quietly.

The furnace crew seized their charging scoops. Even the onlookers turned suddenly into participants. And the little heap of silvery squares disappeared rapidly into the furnace. Some, slipping from the scoops, tinkled lightly against the floor.

Gayevoi noted with surprise that the shop manager had chosen for the first heat of the new steel the Comsomol furnace,\* run by workers far younger and less experienced than the others in the shop. But, noting the confidence of melter

\* Comsomol furnace—a furnace entirely manned by workers who are members of the Comsomol, or Communist Youth League.—*Trans.*

Nikitenko and the smooth teamwork of the entire crew, he was soon assured that the choice was not mistaken.

When the next test came from the express laboratory, Krainev ordered an assay taken.

Instead of the usual display of fireworks, the steel came out of the spoon without a single spark, and spread quietly, like oil. When poured into the test mould, it filled it evenly, forming a gleaming, mirror-like surface.

Whispered exclamations came from the on-lookers.

"Like mercury," said Shatilov softly, breathless with admiration. He turned to ask something of Krainev, but the latter had already started for the back of the furnace, where the helpers were waiting impatiently at the spout for the word of command.

The watchers followed, and stopped by the rail in tense expectation.

No matter how many years a man has worked in open-hearth shops, no matter how much metal he has made in his day, the tapping of the furnace, the instant when the steel is born, can never fail to move him. It is always a moment of tension and of triumph. In many shops, it is still the custom to announce the forthcoming



event by beating a metal disk—not slow, measured beats, but rapid, joyous clangor.

This time, nobody touched the disk. Sound signals had been forbidden. But no signal was needed. From all parts of the shop, the workers gathered—some on the charging level, others along the teeming box, where all was in readiness to receive the steel.

Krainev glanced at his watch, and then at Opanasenko. A few seconds passed in silence. Then he nodded. The furnace helpers raised their long iron bar and launched a few powerful, well-directed blows at the plugged tap hole.

Flame burst, roaring dully, from the opening, and immediately brightened. A dazzling stream of liquid steel rushed with a heavy roar into the ladle.

The teeming bay seemed afire. The crane track girders and the girders supporting the roof, sunk in shadow until the tapping, now stood forth in clear outline. The watchers could see even the gleaming eyes of the crane driver, waiting in his cab for the signal to lift the ladle with its load of steel.

Only a moment before, all had yet been in the power of the man who directed the process. There had still been the possibility of changing, of correcting, the ratio of mixture. But now

the choice had been made. The decision was final. In some twenty or thirty minutes, the liquid steel would begin to harden in the iron ingot moulds.

Krainev looked up. Catching the crane driver's eye, he pointed to the ladle. Enormous hooks clicked into place. Slowly rising, the ladle moved heavily across the shop towards the teeming bay.

The teemers hurried in the same direction. They, too, were present in far greater force than usual. Like the melters, many had stayed on after the evening shift to see the first heat tapped.

Only now did Gayevoi approach the shop manager. Stopping beside him on the stairs to the teeming bay, he asked:

"Well, how is it? Success?"

"It should be," Krainev replied. "I kept strictly to calculations. But just the same, I'm waiting anxiously for the final test sheet. You know, Grigori Andreyevich—aside from science, in this job, a lot depends on skill and experience."

"Which you seem to have in good measure," said Gayevoi.

"What makes you think so?"

"You keep so cool."

Krainev smiled.

"You always seem cool too," he said. "Only I put no great faith in that. Coldness comes with indifference. With you, it's pure self-control." He

glanced at Gayevoi's temples, where the thick black hair was lightly streaked with silver. "Nobody can tap a furnace coolly. Down in your heart, you're always worried."

And, as though ashamed of this sudden confession, he turned away to watch the steel, now mounting slowly in the moulds.

When the teeming was done, they went to the laboratory, where the fate of the steel was being determined. Gayevoi stood smoking silently, watching the laboratory assistants, who were working with unwonted haste. Even Karevskaya, the laboratory manager, usually quiet and slow-moving, hurried about in evident anxiety. Krainev watched tensely, noting every change in colour of the solutions in the different retorts. One, of a light shade of violet, caught his attention for a moment.

"Why so little manganese?" he wondered, alarmed.

But, as he soon saw, the solution was gradually darkening. He breathed more freely. Another solution, faintly tinged with yellow, indicated low phosphorus content. Pointing it out to Gayevoi, he said, with a pleased smile:

"The less of that, the better."

The rest, however, was not so simple. The green of the nickel solution, the orange of the



chromium, gave him no clue, for he had 30  
had to do with either of these elements.  
would have to wait for the final results. I  
painfully the minutes dragged!

"Eight elements instead of the usual 10  
It's enough to drive you mad, waiting for the  
to finish," he whispered. Gayevoi smiled und  
standingly.

Shatilov came in, throwing a wary glance at  
Karevskaya, who was always implacable in ex  
pelling the curious from her "holy of holies."  
Melter Nikitenko edged in behind the foreman,  
turning on the mistress of the laboratory eyes  
full of half-humorous pleading. Dropping his  
work mitts to the floor by the wall, he sat down  
on them to wait. Then Lutsenko pushed in, throw  
ing the door wide open, with a grim expres  
sion that was meant to say: "Just try and drive  
me out!"

Soon other melters appeared, drawn by the  
common interest in the new armour steel.

Karevskaya tried not to notice them. She  
moved from bench to bench, checking on the  
work of her assistants, sharing in full measure  
the general anxiety for the fate of the heat.  
The waiting workers began to talk among them  
selves, very quietly at first, but later—as test  
after test was completed—with perceptibly in-

creasing animation. At length, only one figure remained to be determined—the chromium content.

As time passed, pungent makhorka smoke began to mingle with the acrid fumes of the reagents.

Karevskaya puckered up her nose disgustingly, but said nothing.

Krainev's eyes were glittering. He said something to Gayevoi, in a half whisper, and laughed. Opanasenko and Lyutov came in. They had been preparing the furnace for the next heat.

"Sergei Petrovich," said Karevskaya faintly, "the heat is spoiled. The chromium is low."

All eyes turned to Krainev. In Shatilov's, he read fright; in Opanasenko's, reproach; in Lutsenko's, sullen gloom.

"There's specifications for you!" Lyutov said, with heavy malice.

"What have the specifications got to do with it?" Krainev returned sharply. "The specifications provide for the final result. It's a question of calculations, and those are mine."

Turning to Karevskaya, he requested:

"Check the test again, please—yourself! It can't be right."

"Very well. I'll make another check," Karevskaya replied; but her expression, as she turned

to the analytical balance, seemed to have greater faith in her assistants' work than in the engineer's calculations.

Another hour of waiting lay ahead.

Laying a hand on Gayevoi's shoulder, Krainev said:

"Come along. We've another furnace to prepare for tapping."

"Another furnace?" asked Gayevoi, greatly surprised. "How's that? You only had orders for one, so far."

"Yes, that's so. But I look at it differently. I was supposed to tap fourteen heats in ten days, but I started four days late. One furnace won't fill the assignment. Two will."

"You should have let the director know what you had in mind," said Gayevoi reproachfully. "It would have made him a little easier. After all, he's just as anxious as any of us."

"I believe in getting results before I talk about them," Krainev returned. "At least one heat," he added, with an expectant glance in the direction of the laboratory.

"To make this steel right is no great merit," he was thinking; "but to fall down on making it—that's a disgrace."

"A disgrace!" he said aloud, turning sharply away. Gayevoi glanced at him anxiously, and,



thinking to divert his mind, began to talk about the latest reports from the front.

"The front," reflected Krainev bitterly. "The front needs armour plate, and I give it scrap."

The conversation flagged. Both were too depressed to talk.

"It's the first heat," Gayevoi told himself, seeking some justification for the shop manager. "All sorts of little things may have gone wrong. It sometimes takes weeks to master grades of steel that are less complex than this. Only why did he have to shoulder all the responsibility himself? After all, there's the chief engineer, and the engineering department. They could have helped. Is it vanity—wanting to hog all the glory? No. It's not that. Simply, confidence in himself and in his workers. But just the same, the results...." And Gayevoi cursed himself for his failure to summon Makarov while the steel was still in the furnace.

"I'll call him in for the second heat, at least," he decided, and made for the nearest telephone.

The director appeared beside No. 1 furnace, followed by the chief engineer. Makarov, gesticulating heatedly, seemed to be urging something on the director; but Dubenko only waved him

off impatiently and strode on along the charging level to where Krainev was standing.

Sergei Petrovich had the impulse to turn on his heel and leave. Controlling himself, however, with some effort, he remained where he was.

"Here goes," he thought.

Coming up to him, Dubenko stopped abruptly. Only the presence of the workers, it was evident, restrained the director from a violent outburst of indignation.

The laboratory door flew open, and Shatilov came running out along the charging level.

"Sergei Petrovich," he cried. "It's all right. The chromium's all right! They checked it. The first test was wrong!"

Makarov glanced at the director.

Dubenko extended a hand to Krainev.

"Congratulations," he said.

"I'm preparing another heat for tapping," Krainev reported, wondering how the director would receive his announcement.

Dubenko laughed.

"So I see," he said. "I'm not blind."

The melters came thronging noisily out of the laboratory. Then Karevskaya appeared, beaming with pleasure, flourishing the laboratory certificate of the first heat.

And from that day on a new type of steel flowed from the open-hearth furnaces.

In place of the noisy, rimming, effervescent mass that rushed down the spout when ordinary steel was made, the ladles received a thick, quiet, high-quality metal, designed for armour plate.

## CHAPTER TWO

Coming into the laboratory, early one morning, Krainev learned that No. 3 furnace had turned out a heat which was not up to specifications. His lips set in a grim line. This was the second failure since his shop had begun to work on the defence assignment.

As always, Krainev began the day by making an unhurried tour of the shop. Pausing at the furnaces, he pointed out, here excessive draft, there a pile of rubbish on the charging level. He checked the readings of the recording instruments, and made several notes in his memorandum book. Only when this was done did he set out for the record room to receive the report of the night shift.

Before the war, the workers had never gathered for the report immediately upon the whistle. It had been the custom to come in a quarter